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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/489,356	01/21/2000	Hong Shih	AM-1622.D1	5730

32588 7590 04/07/2003

APPLIED MATERIALS, INC.
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EXAMINER

ZERVIGON, RUDY

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/489,356

Applicant(s)

SHIH ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,8-23 and 28-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2,3,8-11,17 and 28-31 is/are allowed.
- 6) ☒ Claim(s) 1,12-16,18-23,32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. The After Final amendment filed December 18, 2002 (paper 15) is entered. An action on paper 15 follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 12, 13, 15-16, 18-23, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quartarone (USPat. 5,104,514) in view of J.Linke et al ("Behavior of boron-doped graphites, plasma-sprayed B₄C, and a-C/B:H as plasma-facing materials"). Quartarone teaches coating aluminum-based substrates (abstract). Specifically, Quartarone teaches:

- i. Optionally, (column 1, lines 29-39) roughing a surface of a substrate to a value of surface finish Ra of 10.161-17.78 μ m RMS – claims 1(a), 8(a) "400-700microinches RMS" = 10.161-17.78 μ m RMS
- ii. Anodizing the roughed surface - claims 1(b), 8(b)
- iii. Coating the roughed and anodized surface with a "protective material" by "plasma spraying a ceramic material" (PECVD) - claims 1(c), 7

Quartarone does not teach that the protective coating of the roughened and anodized surface is boron carbide. Quartarone does not teach roughing a surface of a substrate to a value of surface

Art Unit: 1763

finish Ra within the range $2.5\mu\text{m} < \text{Ra} < 7.6\mu\text{m}$ RMS. Quartarone does not teach anodizing a portion of the roughened surface.

Linke et al teaches protecting plasma facing surfaces of plasma confining chambers by applying plasma CVD and plasma sprayed B₄C grains (boron carbide; "Materials and Characterization", paragraphs 3-5; "Erosion Behavior", entire section). Specifically, J. Linke et al teaches:

- i. A method of coating boron carbide, as B₄C grains between B₄C and B₁₃C₃, (CVD, "Materials and Characterization", paragraphs 3-5; "B/C ratios" - first sentence; "low-pressure plasma spray" - 6th paragraph, left column, page 228) on a stainless steel and other substrates ("Materials and Characterization", paragraph 4; "Inconel 600")
- ii. Forming a boron carbide layer upon the surface ("Materials and Characterization", paragraphs 3-5)
- iii. The boron carbide layer of 25wt% of carbon relative to boron as represented by B₄C ("Materials and Characterization", paragraph 3)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use J. Linke et al's plasma sprayed boron carbide as Quartarone's "coated protective material" (claims 1(c), 8(c)) and for Quartarone to anodize a portion of the roughened surface including optimizing the roughening of the substrate to values Ra of less than $10.161\mu\text{m}$ RMS.

Motivation to use J. Linke et al's plasma sprayed boron carbide as Quartarone's "coated protective material" (claims 1(c), 8(c)) and for Quartarone to anodize a portion of the roughened surface is drawn to J. Linke's motivation to provide a material that resists chemical erosion and provides reduced contaminants which improves the plasma performance of plasma-facing

Art Unit: 1763

components (“Impurity Production of a Boronized Wall”) and to Quartarone’s teaching that anodization after roughening is an optional step (column 1, lines 32-40). Further, it would be obvious to those of ordinary skill in the art to optimize the range of Quartarone’s surface finish Ra from 10.161µm RMS to Ra within the range $2.5\mu\text{m} < \text{Ra} < 7.6\mu\text{m RMS}$ (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

3. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Quartarone (USPat. 5,104,514) in view of J.Linke et al as applied to claims 1, 12, 13, 15-16, 18-23, 32, and 33 above, and further in view of Kizawa (JP 63-203098). The teachings of both Quartarone and J.Linke are discussed above. However, both Quartarone and J.Linke do not teach thermal spraying of the boron carbide film.

Kizawa teaches a thermal spraying material (2, Abstract) of boron carbide on aluminum members.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize Kizawa's thermal spraying material of boron carbide.

Motivation for utilizing Kizawa's thermal spraying material of boron carbide on aluminum members is for an alternative and equivalent method of applying boron carbide film.

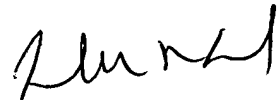
Art Unit: 1763

Allowable Subject Matter

4. Claims 2, 3, 8-11, 17, and 28-31 are allowed.
5. The following is a statement of reasons for the indication of allowable subject matter:
None of the references of record teach the additional step of removing a portion of the anodized layer at a predetermined boundary.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.



JEFFRIE R. LUND
PRIMARY EXAMINER